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ABSTRACT

Introductory college level geography textbooks can be enhanced by using scatter diagrams and double criteria classifications, both of which reveal generalizations and specific facts about location. Scatter diagrams, a series of dots on a graph, illustrate relationships among phenomena that covary, e.g., national birth and infant mortality rates. According to the density or sparseness of the dots, scatter diagrams simultaneously present generalizations and identify exceptions and deviations. The diagrams may be supplemented with maps so that points on the graph are represented by geographic locations. Double criteria classification involves classifying a population of individuals according to the two criteria indicated by each axis on a scatter diagram. For example, the birth and infant mortality rates for a specific country can be charted on two separate maps for a side-by-side comparison. Each of these basic methods communicate information about human geography often lacking in geography texts. Examples of each graphic aid are included. (KC)

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SIMPLIFIED CLASSIFICATIONS FOR TEACHING HUMAN GEOGRAPHY

BY

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SIMPLIFIED CLASSIFICATIONS FOR TEACHING HUMAN GEOGRAPHY

Paper presented at the session, "Geography in Higher Education," Association of American Geographers, annual meeting, San Antonio, TX, 26 April 1982, by Robert H. Stoddard, University of Nebraska, Lincoln, NE

One of the problems I experience when teaching an introductory college course in human geography is this: How should I present general principles of location while at the same time convey accurate geographic information about specific places? This paper summarizes some of my thoughts and conclusions about this question. Although my suggestions only re-emphasize teaching aids that have been around for a long time, I do feel they can serve as useful supplements to the major texts in introductory human geography.

First, let me clarify the issue that faces an instructor of students enrolled in their first college geography course. One of the primary objectives normally is to satisfy the students' curiosity about what is where. In spite of adverse attitudes about an over-emphasis on the capes-n-bays approach, students still seem to desire some facts about various phenomena located at specific places around the world. This is not to deny the value of discussing spatial behavior in an isotropic setting, but most students seem to expect to learn something about the distinctiveness of real-world places.

Most students, however, also expect a collegiate course to consist of more than a compendium of locational facts. And, indeed, the rationale for including geographic knowledge in a college curriculum is based on the body of geographic principles that help explain our external environments and human behavior within various settings. It is only through teaching general principles of location that instructors can provide the fundamental knowledge necessary for understanding specific locations and for predicting future geographic phenomena. Certainly this is my pedagogical goal; and a large

share of my courses in introductory human geography concern basic concepts about the arrangement of people and their associated features.

There is always the danger, however, of over-generalizing or over-simplifying the world. Given the paucity of prior geographic knowledge possessed by students and the limited amount of class and reading time during a single college term, over-simplification can easily occur. For the student, the results may only replace one set of vague perceptions of the world with another set of stereotypes.

Let me illustrate. Suppose an instructor plans to discuss world variations in birth rates as measured by national units. In an attempt to simplify the differences occurring among more than one hundred and fifty units, this instructor states that "birth rates are high in less-developed countries but low in advanced countries". Such a generalization avoids the deadly ideographic listing of birth rates for each and every country, which in itself would provide no basis for anticipating future statistics for these same countries. For the students who previously knew virtually nothing about population growth, this statement may give them a little better idea about demographic differences and their partial relationship with levels of national development. But, for those students who already viewed the world in terms of "we" and "they", this generalization may only reinforce their simplistic belief that the earth is endangered by "the teeming millions of foreigners who are over-populating the earth".

The dilemma facing the instructor is how to blend the one goal of providing general principles possessing valuable predictive power with the second goal of retaining accuracy about locational facts and characteristics. I am suggesting that two techniques having potential for blending these somewhat contradictory goals are (1) scatter diagrams and (2) double-criteria classifications. I will consider the scatter diagram first.

Scattergrams are certainly not new to geographic literature, but they are not common to many college textbooks in human geography. I am surprised by this because scatter diagrams are useful in presenting a large amount of information in a form that is easily comprehended. Showing a scatter of dots on a graph is an effective way of demonstrating a relationship among phenomena that covary. For example, this scattergram (Fig. 1) of national birth and infant mortality rates for 1981 reveals a positive relationship. This second graph (Fig. 2) displays a somewhat inverse association; and, this third one (Fig. 3) exhibits a set of paired values that seem to show very little correlation. Even a pattern of points that suggests a lack of a close relationship, of course, may provide educational value by dispelling misconceptions. In this illustration, birth rates seem to have a weaker relationship with urbanization than is sometimes believed.

Not only can a scatter diagram satisfy the goal of presenting generalizations, but concurrently a graph reveals exceptions and deviations from the primary relationship. For example, in this scattergram (Fig. 1 with 1-A) we can identify numerous countries that fit the general trend -- such as Switzerland, Malaysia, Iran, and Mali -- and also those that are distinctive. Kuwait has a higher birth rate when combined with its infant mortality rate than the general world trend; China's birth rate is exceptionally low when compared with the infant mortality rates of other nations of the world.

When we return to the diagram of birth rates with GNP per capita (Fig. 2 with 2-A), we see similar possibilities for identifying countries that typify our generalization -- and countries that stand-out as major residuals. Again, China's birth rate deviates from the usual one for poor countries. In contrast, the oil-rich countries seem to retain higher-than-expected birth rates in spite of their national wealth. Thus, an examination of residuals, which is an

extremely useful procedure for analytical research, can be just as beneficial in the classroom.

One limitation to this technique is the need for quantitative data. The lack of data is always a handicap, but it is a more obvious deficiency when one is seeking numerical statistics.

A scatter diagram is also limited by the loss of locational information. Even though the paired values that determine the position of each point on a scattergram may be obtained from geographic units, the earth locations of those units are not displayed by the scattergram itself. The absence of visual correspondence between points on the graph and the places they represent on the earth often reduces the effectiveness of a scatter diagram when teaching geography.

One way of reducing this limitation in a scatter diagram is to supplement it with one or more maps. And, this brings me to the second technique I want to stress, namely, the classification of individuals according to two criteria. Showing the spatial variations of phenomena measured by areal units is normally done with choropleth maps. But making a choropleth map requires the cartographer to group the data into several classes. Therefore, mapping those data that are presented on a scattergram requires classifying the population of individuals according to the same two criteria indicated by each axis of the scatter diagram.

There are numerous procedures for objectively classifying data, but I do not want to take time to deal with them here. Instead, I will comment on the ways of presenting the data after they have been classified. To illustrate, suppose we have decided to divide rates of birth and infant mortality into three classes each (Fig. 1 with 1-B). Our interest now focuses on ways of showing a geographic relationship between these two phenomena.

The most common way is to display two choropleth maps so students can visually compare the spatial distributions of each phenomenon (Fig. 4). This method of presenting geographic relationships has been used by teachers of geography for many generations and is well accepted (Fig. 5). Two maps may be compared by placing them side-by-side, as in a textbook; or they may be viewed sequentially or even simultaneously (Figs. 4 and 5).

Directly superimposing maps is difficult when using wall maps or printed ones in a text. However, showing the spatial covariation of two phenomena is possible by classifying individuals -- in this case, nations -- according to both criteria and then mapping the results (Fig. 1 with 1-B). If several classes of phenomena are utilized to indicate the variance in each, a large number of classes composed of double criteria are possible. However, if a close relationship exists between two phenomena, then it is quite likely that some of the classes will be empty. Here with each phenomenon being divided into three categories, we have a potential for nine double-criteria classes. As it turns out, though, one class is empty and two others have only a single individual. Thus, a map showing national characteristics according to these two criteria would not be too complex. Nevertheless, rather than placing all the combinations on a single map (Fig. 6-A), I have used two maps to display the relationship of birth rates and infant mortality rates (Fig. 6-B). Obviously there are other cartographic combinations that could convey a similar message. In any case, the goal of formulating generalizations about areal variations is greatly aided by utilizing simple classifications, especially ones that are selected to display relationships among phenomena.

In summary, the teaching strategies discussed here are not new. However, I believe that most textbooks commonly used in introductory courses in human geography do not

adequately demonstrate generalizations about spatial relationships. In fact, some textbooks do not even provide an adequate set of maps of birth rates nor related phenomena (Table 1). The accuracy of some entries in this table might be challenged because I did not rigorously operationalize all definitions and I may have overlooked a few statements that imply relationships. Nevertheless, the gaps in this table indicate the reasons I am disappointed with the existing textual materials. My message, then, is that an instructor can do a better job of communicating information about human geography than provided by these texts. This can be accomplished simply by including basic graphic materials -- ones which reveal both generalizations, as well as specific facts, of location.

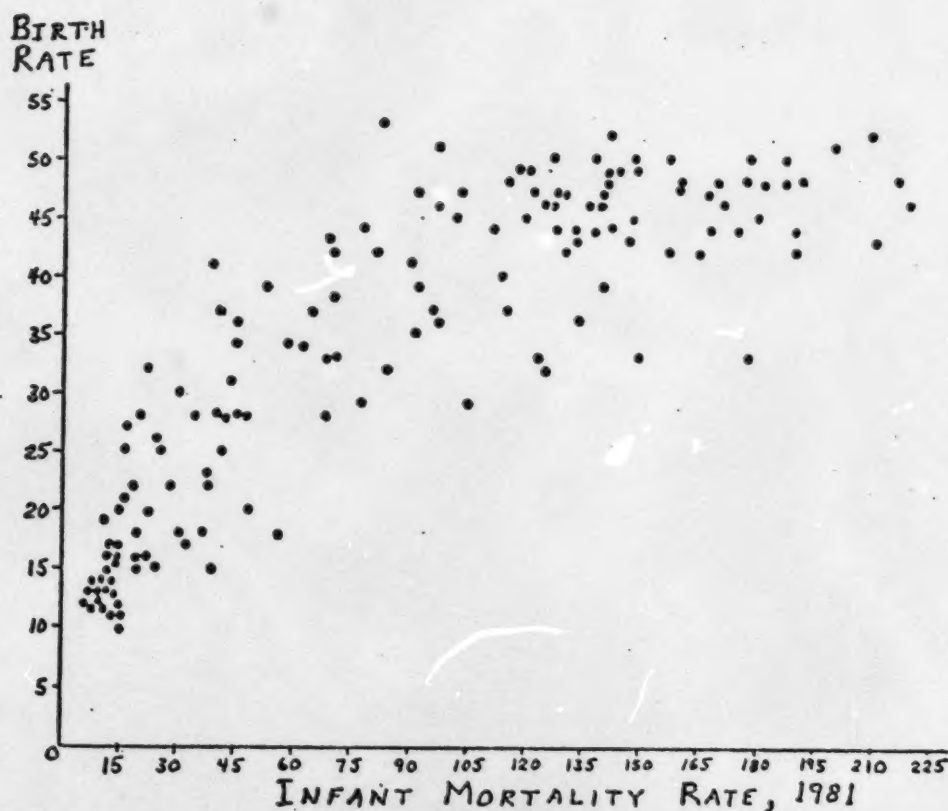


Figure 1

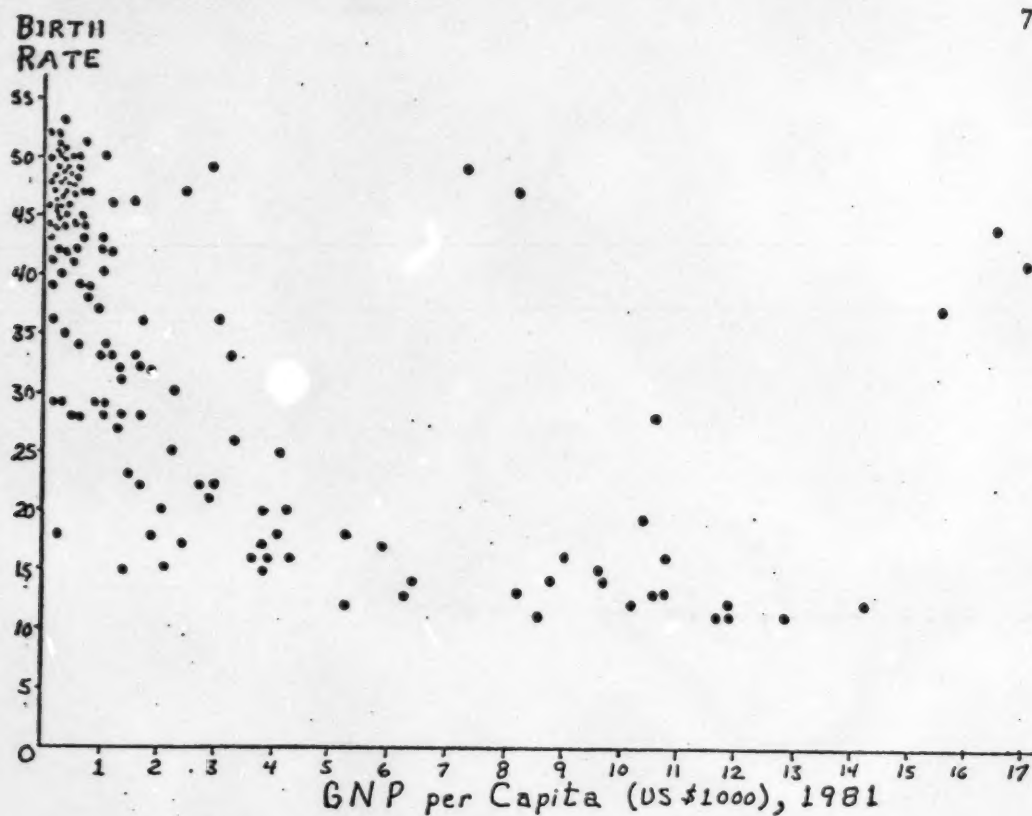


Figure 2

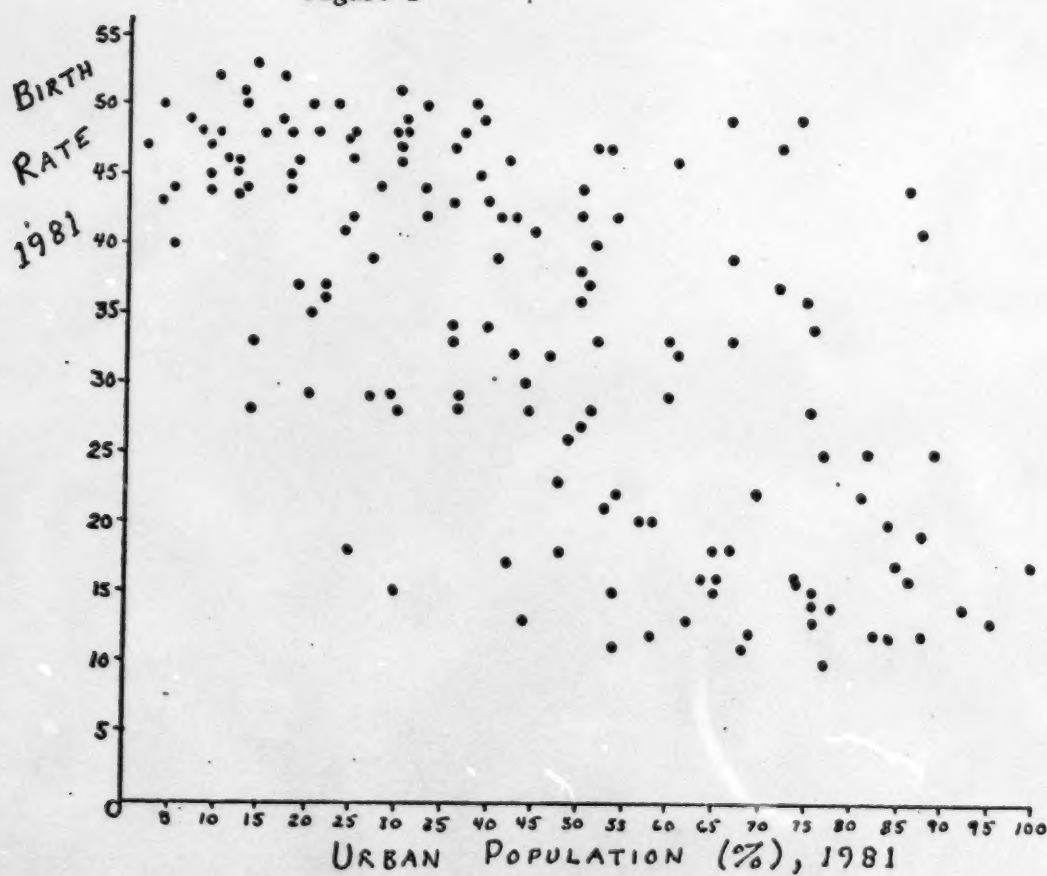
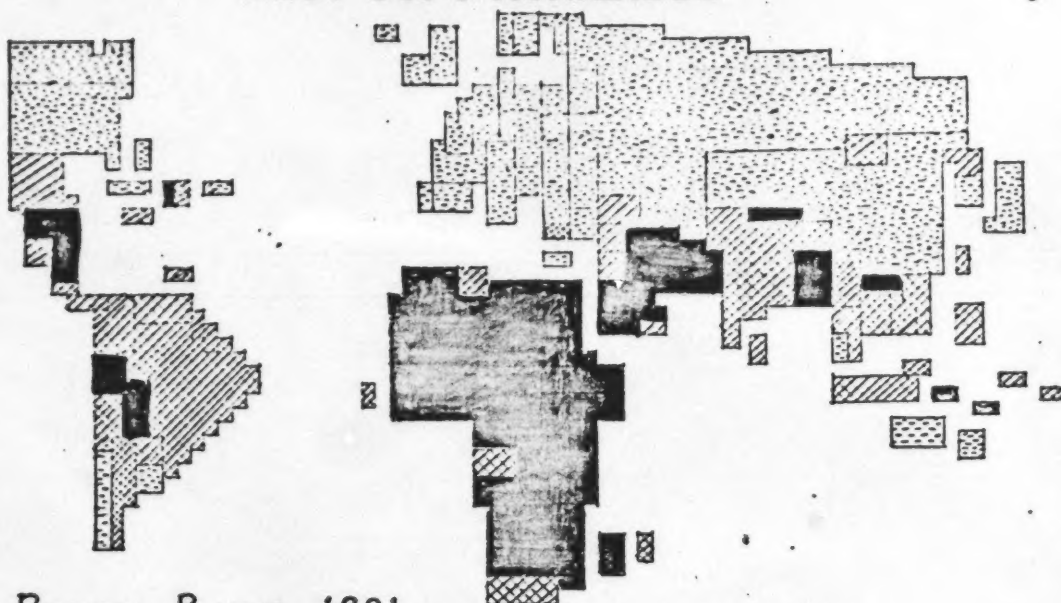


Figure 3



BIRTH RATE, 1981

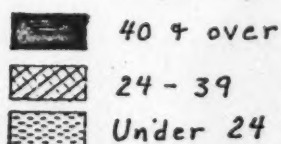
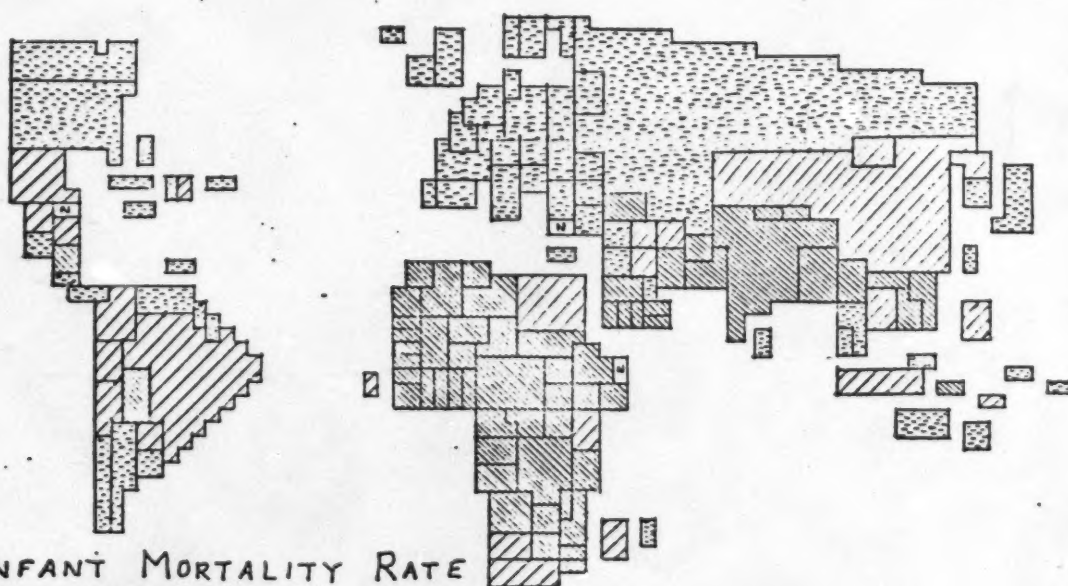
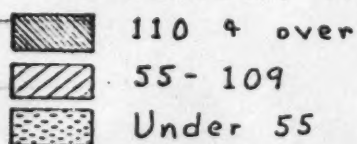


Figure 4



INFANT MORTALITY RATE



N = No DATA

Figure 5

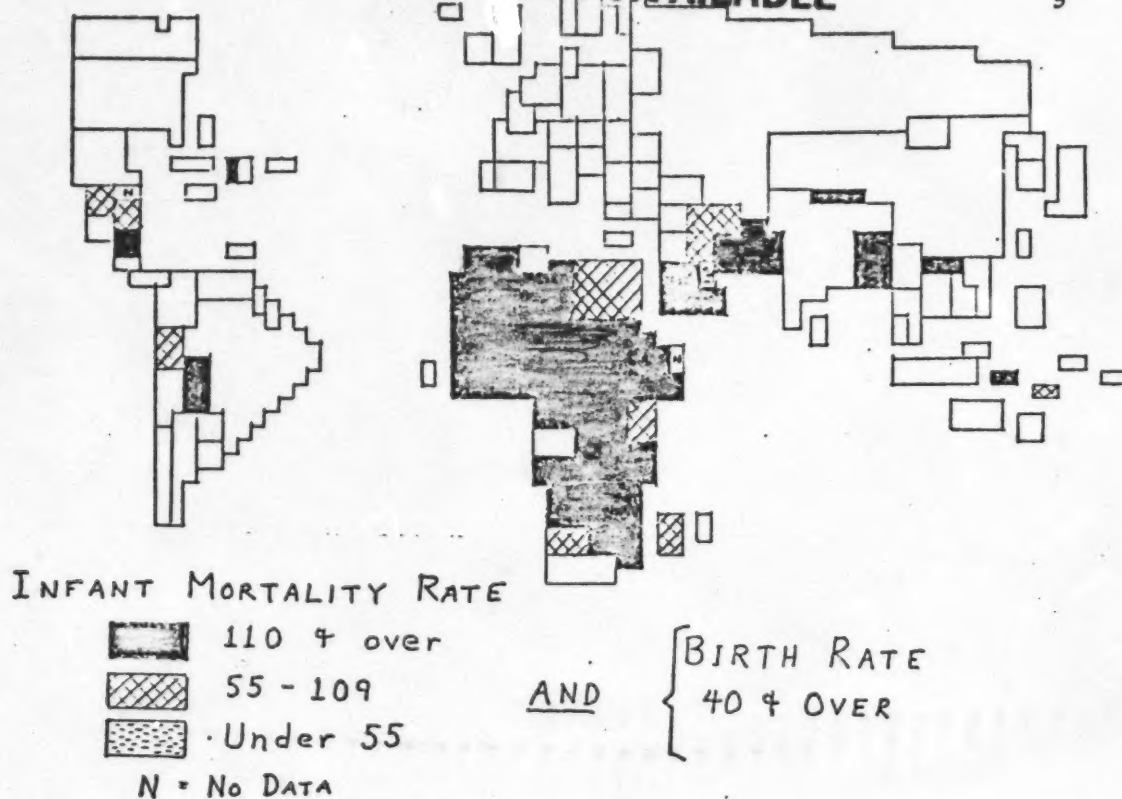


Figure 6-A

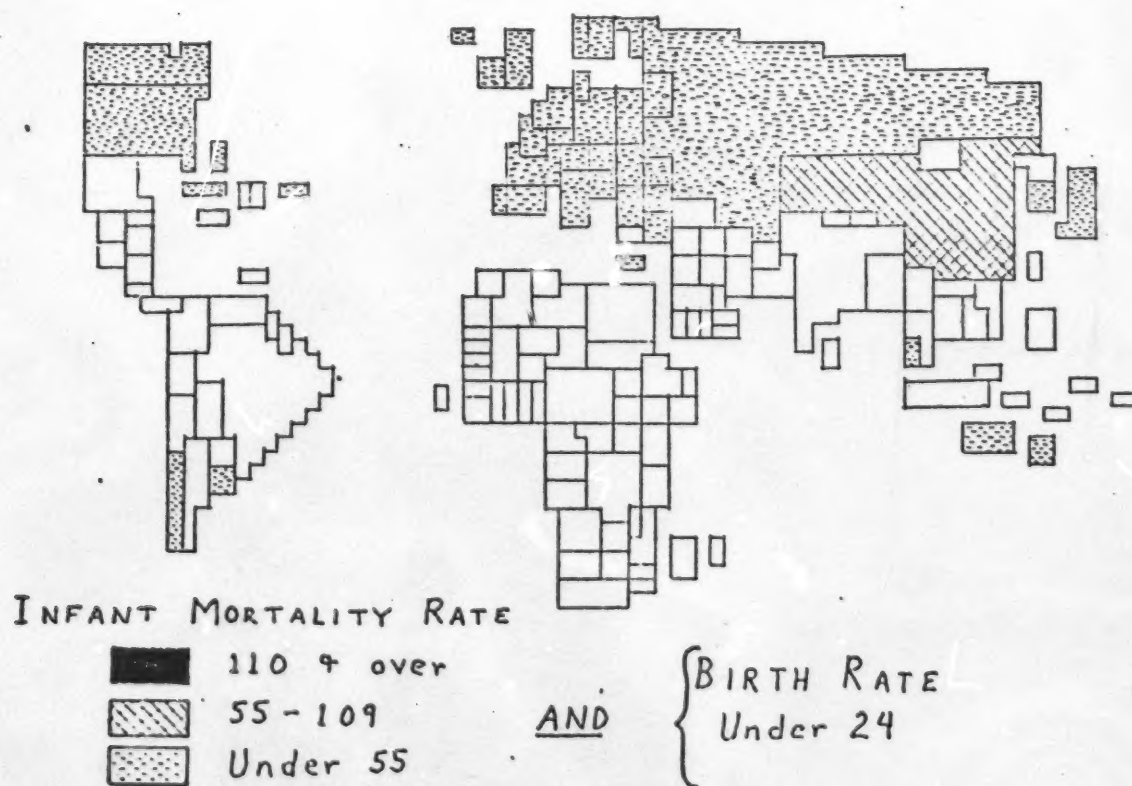


Figure 6-B

TABLE 1. TEXTBOOK COVERAGE OF NATIONAL BIRTH RATES
AND RELATED PHENOMENA

FORM	INFORMATION	TEXTBOOK					
		A	B	C	D	E	F
MAP	1. BIRTH RATES	X	X	P	X	X	
	2. DEATH RATES	X	X		X	X	
	3. INFANT MORTALITY RATES		X		X		
	4. ECONOMIC "LEVEL"	P	X	X	X	X	X
	5. URBANIZATION	X	X			P	
STATEMENT	1 AND 3					X	
	1 AND 4	X				X	X
	1 AND 5	X				X	
TABLE	1 AND 3						
	1 AND 4					S	
	1 AND 5						
SCATTERGRAM	1 AND 3						
	1 AND 4						
	1 AND 5						
MAP	1 AND 3						
	1 AND 4						
	1 AND 5						

P = PARTIALLY RELATED

S = SELECTED ILLUSTRATIONS